

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An air quality system for removing a pollutant from an air stream, and for providing cleansed air to an interior air space, said air quality system comprising:

5 at least one air cleaner unit in communication with said interior air space,

wherein said at least one air cleaner unit provides only a single flow path for said air stream,

wherein said at least one air cleaner unit comprises a first photocatalytic oxidation unit and a first adsorbent unit, and

10 wherein said first photocatalytic oxidation unit is located upstream or downstream from said first adsorbent unit.

2. (Original) The air quality system of claim 1, wherein said first photocatalytic oxidation unit is physically separated from said first adsorbent unit.

3. (Original) The air quality system of claim 1, wherein said first photocatalytic oxidation unit is located downstream from said first adsorbent unit.

4. (Original) The air quality system of claim 3, wherein:

said first adsorbent unit is adapted to reversibly adsorb said pollutant from said air stream at a first concentration of said pollutant, and

 said first adsorbent unit is further adapted to desorb said pollutant
5 into said air stream at a second concentration of said pollutant.

5. (Original) The air quality system of claim 1, wherein:

 said at least one air cleaner unit further comprises a second adsorbent unit,

 said first photocatalytic oxidation unit is located downstream from
5 said first adsorbent unit, and

 said second adsorbent unit is located downstream from said first photocatalytic oxidation unit.

6. (Original) The air quality system of claim 5, wherein:

 said first adsorbent unit is adapted to reversibly adsorb said pollutant from said air stream at a first concentration of said pollutant,

 said first adsorbent unit is further adapted to desorb said pollutant
5 into said air stream at a second concentration of said pollutant, and

 said second adsorbent unit is adapted to irreversibly adsorb said pollutant from said air stream.

7. (Original) The air quality system of claim 6, wherein:

 said first adsorbent unit includes a first adsorbent material having a first isotherm curve for said pollutant,

 said second adsorbent unit includes a second adsorbent material
5 having a second isotherm curve for said pollutant, and

 said second isotherm curve is steeper than said first isotherm curve.

8. (Original) The air quality system of claim 5, wherein:
said at least one air cleaner unit further comprises a second photocatalytic oxidation unit, and
said second photocatalytic oxidation unit is located downstream
5 from said second adsorbent unit.
9. (Original) The air quality system of claim 8, wherein said first photocatalytic oxidation unit comprises at least one photocatalytic panel, wherein said photocatalytic panel comprises a photocatalytic support, and wherein said photocatalytic panel comprises expanded aluminum.
10. (Original) The air quality system of claim 1, wherein:
said first adsorbent unit includes a first adsorbent material, said first adsorbent material having micropores in the range of from about 5 to 10 Å in diameter.
11. (Original) The air quality system of claim 10, wherein:
at least about 30% of said micropores have a diameter in the range of from about 5 to 10 Å.
12. (Original) The air quality system of claim 10, wherein:
said first adsorbent material comprises an activated carbon fabric.
13. (Original) The air quality system of claim 1, wherein said interior air space is within an aircraft.
14. (Original) The air quality system of claim 1, wherein said interior air space includes a cabin of an aircraft, and said air quality system further comprises:

5 at least one air intake unit; and
a mix manifold located downstream from said at least one air
intake unit,

wherein said at least one air cleaner unit comprises a first battery of air cleaner units, and wherein said first battery of air cleaner units is located between said mix manifold and said cabin.

15. (Original) The air quality system of claim 1, wherein said at least one air cleaner unit is adapted for passage of a unidirectional air stream therethrough.

16. (Original) The air quality system of claim 1, wherein said at least one air cleaner unit is adapted for continuously providing a stream of cleansed air to a location downstream from said at least one air cleaner unit.

17. (Original) The air quality system of claim 1, further comprising a particulate filter upstream from said at least one photocatalytic oxidation unit and said at least one adsorbent unit

18. (Original) The air quality system of claim 1, wherein said at least one air cleaner unit is adapted for operation at a constant temperature.

19. (Original) The air quality system of claim 1, wherein said at least one air cleaner unit is adapted for operation at ambient temperature.

20. (Original) An air quality system for an interior air space of an aircraft, said interior air space including a cabin, a lower plenum, and an upper plenum, and said air quality system comprising:

a mix manifold for distributing air to said interior air space;

5 a lower recirculation system in communication with said mix manifold;
 an upper recirculation system in communication with said lower recirculation system;
 at least one air intake unit in communication with said mix
10 manifold; and
 a plurality of air cleaner units in communication with said interior air space, each of said plurality of air cleaner units comprising at least one photocatalytic oxidation unit and at least one adsorbent unit, said at least one photocatalytic oxidation unit located upstream or downstream from said at least
15 one adsorbent unit.

21. (Original) The air quality system of claim 20, wherein:
 said plurality of air cleaner units comprise a first battery of air cleaner units coupled to said lower recirculation system, and
 said first battery of air cleaner units adapted for receiving air
5 directly from said lower plenum.

22. (Original) The air quality system of claim 20, wherein:
 said interior air space further includes a flight deck, and
 said plurality of air cleaner units comprise at least one air cleaner unit located between said air intake unit and said flight deck.

23. (Original) The air quality system of claim 20, wherein:
 said upper recirculation system includes a plurality of cabin supply lines, and
 said plurality of air cleaner units comprise a second battery of air
5 cleaner units, and

said second battery of air cleaner units is coupled to said plurality of cabin supply lines.

24. (Original) The air quality system of claim 23, wherein said second battery of air cleaner units are adapted for receiving air directly from said upper plenum.

25. (Original) The air quality system of claim 20, wherein:
said air intake unit is located upstream from an ECS of said aircraft, and
said plurality of air cleaner units are located downstream from said

5 ECS.

26. (Original) A vehicle, comprising:
an air quality system including at least one air cleaner unit and an interior air space,

5 said at least one air cleaner unit in communication with said interior air space,

said at least one air cleaner unit comprising a first photocatalytic oxidation unit, a first adsorbent unit, and a second adsorbent unit,

said first photocatalytic oxidation unit is located downstream from said first adsorbent unit, and

10 said second adsorbent unit located downstream from said first photocatalytic oxidation unit.

27. (Original) The vehicle of claim 26, wherein said at least one air cleaner unit further comprises a second photocatalytic oxidation unit, and said second photocatalytic oxidation unit is located downstream from said second adsorbent unit.

28. (Original) The vehicle of claim 26, wherein:
said first photocatalytic oxidation unit and said second photocatalytic oxidation unit each comprise at least one photocatalytic panel and at least one UV source, and
5 said at least one panel comprising a photocatalytic support and a photocatalytic agent disposed on said photocatalytic support.

29. (Original) The vehicle of claim 26, wherein:
said first adsorbent unit includes a first adsorbent material, and
said first adsorbent material comprises an activated carbon fabric having micropores in the range of from about 5 to 10 Å in diameter.

30. (Original) The vehicle of claim 26, wherein said interior air space includes an aircraft cabin.

31. (Original) The vehicle of claim 26, wherein:
said interior air space includes a flight deck,
said vehicle includes an air intake unit in communication with said flight deck, and
5 said at least one air cleaner unit is arranged between said air intake unit and said flight deck.

32. (Original) The vehicle of claim 26, further comprising an ECS, and wherein said at least one air cleaner unit is located downstream from said ECS.

33. (Previously Presented) An air cleaner unit for removing a pollutant from an air stream, comprising:
a first photocatalytic oxidation unit; and

5 a first adsorbent unit, wherein,
said air cleaner unit defining only a single flow path for said air stream.

34. (Original) The air cleaner unit of claim 33, wherein:
said first photocatalytic oxidation unit is located upstream or downstream from said first adsorbent unit, and
said air cleaner unit is adapted for unidirectional passage of said
5 air stream through said first photocatalytic oxidation unit and said first adsorbent unit.

35. (Original) The air cleaner unit of claim 33, further comprising a particulate filter located upstream from said first photocatalytic oxidation unit and said first adsorbent unit.

36. (Original) The air cleaner unit of claim 33, wherein:
said first adsorbent unit includes a first adsorbent material, said first adsorbent material having micropores therein, and
wherein at least about 30% of said micropores have a diameter in
5 the range of from about 5 to 10 Å.

37. (Original) The air cleaner unit of claim 33, wherein:
said first adsorbent material comprises an activated carbon fabric.

38. (Original) The air cleaner unit of claim 33, further comprising a second adsorbent unit, wherein said first photocatalytic oxidation unit is located downstream from said first adsorbent unit, and said second adsorbent unit is located downstream from said first photocatalytic oxidation unit.

39. (Original) The air cleaner unit of claim 38, wherein:
 - 5 said first adsorbent unit includes a first adsorbent material having a first isotherm curve for adsorption of said pollutant,
 - 10 said second adsorbent unit includes a second adsorbent material having a second isotherm curve for adsorption of said pollutant, and
 - 15 said second isotherm curve is steeper than said first isotherm curve.
40. (Original) The air cleaner unit of claim 33, wherein:
 - 5 said first photocatalytic oxidation unit comprises at least one photocatalytic panel and at least one UV source, and
 - 10 said photocatalytic panel comprises a photocatalytic support and a photocatalytic agent on said metal support.
41. (Original) The air cleaner unit of claim 33, wherein:
 - 5 said first photocatalytic oxidation unit comprises a plurality of photocatalytic panels and a plurality of UV sources, and
 - 10 said plurality of photocatalytic panels and said plurality of UV sources are arranged linearly and parallel to each other, with each of said plurality of UV sources alternating with each of said plurality of photocatalytic panels.
42. (Original) The air cleaner unit of claim 33, wherein said first adsorbent unit comprises an apparatus selected from the group consisting of packed bed of carbon, a carbon fabric, a solid carbon monolith, and a carbon-coated monolith.
43. (Original) An air cleaner unit for removing a pollutant from an air stream, comprising:

a first adsorbent unit;

a first photocatalytic oxidation unit located downstream from said

5 first adsorbent unit;

a second adsorbent unit located downstream from said first photocatalytic oxidation unit; and

a housing,

said first adsorbent unit, said first photocatalytic oxidation unit, and

10 said second adsorbent unit arranged parallel to each other within said housing,

said housing defining a single flow path for said air stream,

said first adsorbent unit, said first photocatalytic oxidation unit, and

said second adsorbent unit arranged orthogonal to said air stream,

wherein said first photocatalytic oxidation unit comprises a plurality

15 of photocatalytic panels, each of said plurality of photocatalytic panels comprises a photocatalytic support and a photocatalytic agent disposed on said photocatalytic support.

44. (Original) The air cleaner unit of claim 43, wherein:

said first adsorbent unit includes a first adsorbent material having

a first isotherm curve for adsorption of said pollutant, and

said second adsorbent unit includes a second adsorbent material

5 having a second isotherm curve for adsorption of said pollutant, and

wherein said second isotherm curve is steeper than said first isotherm curve.

45-63. (Canceled)

64. (Previously presented) The air quality system of claim 1, wherein:

said first photocatalytic oxidation unit comprises at least one photocatalytic panel and at least one UV source, and

5 said photocatalytic panel comprises a photocatalytic support and a photocatalytic agent on said metal support.

65. (Previously presented) The air quality system of claim 1, wherein:

 said first photocatalytic oxidation unit comprises a plurality of photocatalytic panels and a plurality of UV sources, and

5 said plurality of photocatalytic panels and said plurality of UV sources are arranged linearly and parallel to each other, with each of said plurality of UV sources alternating with each of said plurality of photocatalytic panels.

66. (Previously presented) The air cleaner unit of claim 33, wherein said first adsorbent unit is arranged parallel to said first photocatalytic oxidation unit in a housing.